Polycomb repressive complex 1

Polycomb repressive complex 1 (PRC1) is one of the two classes of Polycomb Repressive complexes, the other being PRC2. Polycomb-group proteins play a major role in transcriptional regulation during development. Polycomb Repressive Complexes PRC1 and PRC2 function in the silencing of expression of the Hox gene network involved in development as well as the inactive X chromosome.

PRC1 inhibits the activated form of RNA polymerase II preinitiation complex with the use of H3K27me. PRC1 binds to three nucleosomes, this is believed to limit access of chromatin to transcription factors and therefore limit gene expression.

Polycomb repressor complex 1-chromobox7 (CBX7) has emerged as a key regulator in several cellular processes including stem cell self-renewal and cancer cell proliferation. The hypoxic environment triggering NPC self-renewal after CBX7 activation remains unknown. In this study, we found that the upregulation of CBX7 during hypoxia and ischaemia appeared to be from hypoxia-inducible factor-1α (HIF-1α) activation. During hypoxia, the HIF-1α-CBX7 cascade modulated NPC proliferation in vitro. NPC numbers significantly decreased in CBX7 knockout mice generated using CRISPR/Cas9 genome editing.

Chiu et al. provided the novel insight that CBX7 expression is regulated through HIF-1α activation, which plays an intrinsically modulating role in NPC proliferation [1].

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Chiu HY, Lee HT, Lee KH, Zhao Y, Hsu CY, Shyu WC. Mechanisms of ischaemic neural progenitor proliferation: a regulatory role of the HIF-1α-CBX7 pathway. Neuropathol Appl Neurobiol. 2019 Oct 19. doi: 10.1111/nan.12585. [Epub ahead of print] PubMed PMID: 31630421.